

Subject	CHEMISTRY	Grade	9
Student		Date	

### ASSESSMENT TASK - IDENTIFYING THE TYPES OF BONDS IN UNKNOWN SUBSTANCES

You have to design an experiment to identify the types of bonds in unknown substances depending on their properties.

Your work should be presented in the following way:

- **Aim/Research Question** - Describe a problem or question to be investigated (What are you going to investigate?).
- **Hypothesis** - Make a prediction with a detailed scientific explanation of what you think will happen.
- **Variables** - Independent, Dependent and Controlled (explain how you will manipulate them).
- **Materials** - Detailed list of equipment.
- **Method** - Describe in steps what you will do, remember to use command words to start the sentence.
- **Results** - Table of data, remember labels and units.
- **Conclusion** - Describe and explain your results correctly using scientific reasoning.
- **Evaluation** - Discuss the validity of your hypothesis based on the data you collected (how confident are you? why?), discuss the validity of the method (did you manipulate the variables so it was a fair test?) and describe improvements and extensions (further experiments).

The planning is in **pairs** however the write up is in **individual**. You will be graded on **Criteria B and C**.

### CRITERIA AND ASSESSMENT RUBRICS

#### Criterion B: Inquiring and Design

level	Level descriptor	Student	Teacher
0	The student does not reach a standard described by any of the descriptors below.		
1-2	The student is able to: i. <b>state</b> a problem or question to be tested by a scientific investigation, with <b>limited success</b> ii. <b>state</b> a testable hypothesis iii. <b>state</b> the variables iv. design <b>a method, with limited success</b> .		
3-4	The student is able to: i. <b>state</b> a problem or question to be tested by a scientific investigation ii. <b>outline</b> a testable hypothesis <b>using scientific reasoning</b> iii. <b>outline</b> how to manipulate the variables, and <b>state</b> how <b>relevant data</b> will be collected iv. design <b>a safe method</b> in which he or she <b>selects materials and equipment</b> .		
5-6	The student is able to: i. <b>outline</b> a problem or question to be tested by a scientific investigation ii. <b>outline and explain</b> a testable hypothesis <b>using scientific reasoning</b> iii. <b>outline</b> how to manipulate the variables, and <b>outline</b> how <b>sufficient, relevant data</b> will be collected iv. design <b>a complete and safe method</b> in which he or she <b>selects appropriate materials and equipment</b> .		
7-8	The student is able to: i. <b>describe</b> a problem or question to be tested by a scientific investigation ii. <b>outline and explain</b> a testable hypothesis <b>using correct scientific reasoning</b> iii. <b>describe</b> how to manipulate the variables, and <b>describe</b> how <b>sufficient, relevant data</b> will be collected iv. design <b>a logical, complete and safe method</b> in which he or she <b>selects appropriate materials and equipment</b> .		

**Criterion C: Processing and Evaluating**

level	Level descriptor	Student	Teacher
0	The student does not reach a standard described by any of the descriptors below.		
1-2	The student is able to: i. <b>collect and present</b> data in numerical and/or visual forms ii. <b>accurately interpret</b> data iii. <b>state</b> the validity of a hypothesis <b>with limited reference</b> to a scientific investigation iv. <b>state</b> the validity of the method <b>with limited reference</b> to a scientific investigation v. <b>state limited</b> improvements or extensions to the method.		
3-4	The student is able to: i. <b>correctly collect and present</b> data in numerical and/or visual forms ii. <b>accurately interpret</b> data and <b>describe</b> results iii. <b>state</b> the validity of a hypothesis based on the outcome of a scientific investigation iv. <b>state</b> the validity of the method based on the outcome of a scientific investigation v. <b>state</b> improvements or extensions to the method that would benefit the scientific investigation.		
5-6	The student is able to: i. <b>correctly collect, organize and present</b> data in numerical and/or visual forms ii. <b>accurately interpret</b> data and <b>describe</b> results <b>using scientific reasoning</b> iii. <b>outline</b> the validity of a hypothesis based on the outcome of a scientific investigation iv. <b>outline</b> the validity of the method based on the outcome of a scientific investigation v. <b>outline</b> improvements or extensions to the method that would benefit the scientific investigation.		
7-8	The student is able to: i. <b>correctly collect, organize, transform and present</b> data in numerical and/ or visual forms ii. <b>accurately interpret data</b> and <b>describe</b> results <b>using correct scientific reasoning</b> iii. <b>discuss</b> the validity of a hypothesis based on the outcome of a scientific investigation iv. <b>discuss</b> the validity of the method based on the outcome of a scientific investigation v. <b>describe</b> improvements or extensions to the method that would benefit the scientific investigation.		

Student Reflection

Teacher Feedback

Property	Ionic Substances	Covalent Substances	Metallic Substances
<b>Bond between</b>	Metal and Non-Metal	Non-Metal and Non-Metal	Metals
<b>Physical State</b>	Solids at room temperature, due to very strong attractions between the ions. Form large regular crystal structures.	Exist in all three states at room temperature.	All are solids at room temperature except mercury. Form large regular crystal structures.
<b>Electrical Conductivity</b>	Do not conduct electricity when solid, but they can when molten or dissolved in water.	Most are very bad conductors of electricity there are however a few exceptions.	Excellent conductors of electricity.
<b>Melting and Boiling Points</b>	High usually above 400 °C.	Relatively low (there are however a few exceptions).	Very High.
<b>Solubility</b>	They are very <b>soluble</b> in water and other <b>polar</b> liquids.	They are <b>insoluble</b> in water but can be soluble in non-polar solvents (hexane).	<b>Insoluble</b> in water and non-polar solvents.
<b>Maleability</b>	They are hard but brittle.	Normally brittle (except for Diamond which is the hardest known substance).	Maleable